





REMARKS UPON SOME STRICTURES IN RELATION TO  
INSPECTION OF WEIGHTS AND MEASURES WHICH  
APPEARED IN THE HAMILTON *SPECTATOR*.

by A. Brunel

DEAR SIR,—I have to thank you for directing my attention to the two editorials which have appeared in the Hamilton *Spectator*, in relation to weights and measures.

I regret the political character of these articles as I do the obnoxious epithets they contain. Not on personal grounds, but because I think the public interests would be served if the subject to which they refer were temperately and judiciously discussed, while I am persuaded that no good can come of exaggerated statements or unfair aspersions.

I have no difficulty in knowing what manufacturing firm is referred to in the article which appeared in the *Spectator* of the 28th ultimo. In July, 1876, I had a long interview with the practical member of that firm, who admitted the cogency of the reasons upon which the regulations, then in force, were based, even to that which related to the balance ball, which he admitted could be used for fraudulent weighing, though he contended that it is a necessary convenience.

The regulation as to this appendage to the platform scale has been modified, and in its original form had been allowed to remain in abeyance before I had the interview above referred to, but there is no difficulty in defending that regulation as necessary in the interests of the general public. The modification was made in deference to custom and prejudice, not in deference to reason. That such an appendage is unnecessary is proved by the fact that tens of thousands of platform scales made to weigh from 20 tons down to 100lbs. are in use without it, and I venture to say that when the uses to which it may be made subservient come to be fully understood by consumers and the public generally it will have fewer friends in Canada.

It is not necessary to go outside the City of Hamilton for a case in which the balance ball of a platform scale had been systematically used for fraudulent weighing, and did time permit, I believe I could refer you to evidence in the files of the *Spectator* that farmers and others have not always been justly dealt with by the weighers of Hamilton.

I will not now occupy more of your time on this point, but if you desire to follow it up I will gladly accompany you; meantime I refer you to Sections 69 to 78, pp. xx to xxii of my report laid before Parliament last Session, of which I enclose a copy.

A few words as to the counterpoise of large scales may be necessary to meet the allegations of the *Spectator* on that point. This counterpoise has usually been so arranged that its weight could be increased or diminished by the abstraction or addition of shot, as the conscience of the weighmaster might suggest. The necessity for such a state of things, even as a convenience, cannot be made out, and it is certainly most dangerous to the public. Its existence is the true explanation of most cases of short weight in coal and of over weight in grain. By this so-called *convenience* grain buyers have not hesitated to compensate themselves for possible losses by wasteful and slovenly handling of grain.

The counterpoise is as much a *weight* as any appliance for weighing can possibly be, and there is no more reason for permitting its value as such to be changed at the will of the weigher, in order to compensate the accumulation of snow, ice or dirt on the platform than there is for permitting a grocer to change the value of a ten or five pound weight, in order to escape the trouble of cleaning his scales. And I would here emphasise the fact that any error in the counterpoise is magnified in the ratio which the weight poise bears to the load weighed. If the balance ball as now admitted is not enough for effecting the adjustment the remedy is to take the *tare* of the excess or deficiency which will then become a part of the weighing, and will thus challenge the attention of both parties to the transaction. Such cases will however be very rare, and will occur only in the use of very clumsily constructed scales.

I have sometimes been surprised that there is not the same degree of anxiety to protect the buyers of goods sold by weight or measure, as there is to champion the manufacturer of and dealers in scales, &c. This absence of all care for the interests of purchasers presents itself with special force in connection with the Grove Trip Scale, which is next referred to by the *Spectator*. These scales while saving the grocer a very little trouble in taking care of his small weights, make it difficult, practically impossible, for the customer to check the weighing. He cannot see whether he is receiving full or short weight, because the side beam for weighing fractions of a pound is necessarily towards the weigher, who as a rule is the seller. The seller may always be honest, but since the custom of trade puts in his hands the determination of the quantities delivered and there-

for gives him a decided advantage over his customer, it is no more than reasonable that the law should insure that the apparatus used for the determination of quantities shall be of such nature that the buyer may at least have a chance of knowing whether he gets all he pays for. This chance he has when he sees a stamped weight placed in the pan, or when he sees a stamped counterpoise in a notch on a properly marked beam, but when he can see neither the one or the other he is clearly at a disadvantage. Let us suppose the custom of trade reversed, and that the buyer becomes the weigher with his own instruments selected by himself. Would not the seller become very tenacious of any rights the law gave him as to the nature of the apparatus used by his customer? Would he not expect the agents of the Government to administer the laws strictly for his protection? Would he rest satisfied that all his customers would weigh honestly?

To the artisan and others with small incomes this is really a very important matter, and the regulation complained of was made in their interest. I may add that the practical gentlemen with whom I discussed this matter, and to whom reference is made at the outset of this letter, admitted all that I had to urge against the description of scale in question, and expressed no regret at the prospect of their use being prohibited.

A public officer ought not to escape just censure, but when a public journalist, screening himself behind that irresponsible *we*, undertakes the business of censor, he should perform his self-imposed function with equity, and his utterances will have most weight when unaccompanied by exaggerated statements. There is not now, nor has there ever been, as asserted by the *Spectator*, a regulation forbidding the use of iron weights of the denomination of one pound. That metal is admitted for one pound weights, and brass, bronze or white metal is only insisted upon for lesser denominations, for the following reasons. Iron oxidizes very rapidly, and when the oxide peels off the weight becomes deficient. This has happened to many thousands of weights which have been submitted for inspection. The smaller the weight the greater is the exposed surface in proportion thereto, and therefore the greater is the percentage of loss. The metals above mentioned as substitutes for iron, oxidize very slowly, and the oxide does not peel off. Again, it is found to be almost impossible to stamp a small iron weight effectually in the iron itself, hence a plug of soft metal is necessary. This can be inserted in a weight of considerable magnitude without much affecting the cost, in fact it is the readiest mode for effecting their adjustment, but to insert such a plug in a weight of half a

pound or less, makes its cost quite equal to that of weights made of the softer metals referred to.

The assertion that a set of brass weights from half a pound downwards, and which altogether will not weigh quite a pound, will cost five dollars, is equivalent to asserting that the makers of them impose upon their customers. I will not insult your intelligence, nor waste your time by explaining why brass of the quality used for such purposes, and by no means finely wrought, cannot be worth more than one dollar per pound.

I am not able just now, for lack of time, to discuss the second article on the same subject, but hope to do so in a few days. Meantime,

I remain,

Yours faithfully,

A. BRUNEL.

Ottawa, October 16th, 1877.

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DEAR SIR,—Accept my thanks for the additional cuttings from the Hamilton papers, and for your letter of the 13th which accompanied them.

Those articles plunge so deeply into politics that I am quite unable to follow them, and shall therefore attempt no more than a reply to the specific objections which they raise to the weights and measures regulations, except in reply to the *Times* which uses me as a shield for its friends. I may be permitted to say that while I do not hesitate to accept the fullest responsibility due to my position, it would be most unreasonable to hold me responsible for the inefficiency or ignorance of officers in whose appointment I have had no voice, and as to whose fitness for the work I have never been consulted nor had any opportunity for forming an opinion. While, therefore, I do not care to waste time in questioning the accuracy of the *Times* as to the degree of responsibility that attaches to me. I must contend that the Minister of Inland Revenue is responsible for the quality of the officers I have to work with, and I should apprehend but little difficulty in shewing that nine-tenths of all the dissatisfaction that has arisen about the inspection had its origin in their indifferent quality.

I observe that the *Times* says I am a Conservative. I trust I shall always desire to conserve what is good, and, according to the *Times* itself, I have an ardent desire to reform abuses. Let me say once for all that I am not a partizan. I am the servant of the public.

I don't know that there is much to say in reply to the second article of the *Spectator* respecting weights and measures. That article, as well as the more recent ones, give, as far as they go, a reasonably fair definition of what the functions of the Government should be in dealing with this branch of the service. But there are two or three other legitimate functions which the writer has not mentioned, but which are of even greater moment than some of those which he has enumerated.

It ought to be, and probably is, well known to scale manufacturers that the "infallible old balance," to quote the *Spectator*, can be, and frequently is made so as to be very fallible indeed, and that the scales which, to quote the same authority, "it has been proved through long years of experience can be made to weigh accurately," can also be made to weigh very inaccurately. As a matter of fact there are makers who have made both for the purpose of facilitating false weighing.

It is the duty of the Government to prevent as far as possible the use of such *fallible* articles. To that end the regulations have been so framed as to exclude from verification, scales &c., that whether intentionally or otherwise might become the instruments of injustice. The Government stamp should be a guarantee of justice, a voucher of honest construction, but the *Spectator* would have it attached to whatever weighing machine is offered so long as it appeared to give correct results at the moment.

The law legalizes both avoirdupois and Troy weights, it therefore becomes necessary to provide that there shall be a well defined distinction in the forms of the two descriptions. Heretofore weights of both kinds have been in use of the denominations of 4lb., 7lb. and 14lb., and of exactly the same form and of similar metal and with similar inscription. There is too much reason for believing that in villages, especially in Lower Canada, the Troy weight has been substituted for avoirdupis, the buyer thereby loosing two-sevenths of the weight he pays for. This therefore is another instance in which it becomes necessary to eliminate the means of fraud, and the regulations provide that Troy weights shall be of a specified form with their denominations inscribed in ounces, while a variety of other forms are specified for avoirdupois weights, their value being inscribed in lbs., &c.

One more instance; the *Spectator* objects to the regulation which requires that the weights used with platform scales shall be equal to the pound or to some multiple, or authorised sub-multiple of the pound, and that they shall be either in a decimal or binary ratio to

the load. As to the former condition I have to observe that its object is to prevent an unreasonable multiplicity of denominations. Unless some restriction of this kind were adopted it would be impossible to know what standards to provide. This might not be so important a matter if all the testing were done at the Inspectors head office, but when an Inspector is sent on long journeys over bad roads, the load he has to carry is an important consideration. So is time. To test a weight with ordinary dispatch it must be weighed against standard weights to one or more of which it should be equal. Ninety per cent. of the weights presented for verification comply, or are intended to comply with this condition. But some few have been presented, the products of unskillful makers which do not. On one occasion a scale was presented of which one of the weights intended to "draw" 50lb on the platform, weighed 8 ounces, 1 dram, 3 scruples and 12 grains, the other weights were multiples of that complex quantity. It would take even a skilful weigher a good while to verify such a weight, and if the figures were not marked on it, which they were not, its verification would involve the testing of the scale by heavy weights to its full capacity, and entail the cost of carting them through the country. The second condition is demanded in order that the proportion of the weight to the load may be simply stated. If a poise indicates 10, 16, 50 or 100 times its weight on the platform, and if it weighs half a pound, one pound, two pounds and so, on it is a simple matter to test the accuracy of the whole apparatus ; but if the poise is a fractional quantity, as in the case above mentioned, and if it is in the proportion of say  $11\frac{1}{2}$  or  $\frac{1}{9}\frac{1}{2}$  to the load the test, although it could be made, becomes a troublesome one and exceedingly apt to lead to error.

And why should not we require the simple proportions ? Fairbanks & Co's. agent informed me that all their scales were made in the one ratio or the other, and I am not aware that any of their make have been rejected for violation of this rule. Mr. Ware, of Gurney & Ware, gave me a similar assurance, and it was on account of his representations that the binary proportion was added to the decimal, in order that the division of the beam of the Union scale into ounces might be possible.

It is only as to matters of this nature that the regulations in any way interfere with the manufacture. The *Spectator*, willingly I must suppose, accepts the statements of interested parties to the contrary, and heaps unsparing abuse on the officers of the Government, and without a shadow of proof or of knowledge on the subject

asserts that they are utterly ignorant of the business, and ought not to interfere in anything relating to forms or arrangement of parts.

We are told that the objection to a particular kind of scale, and the remedy proposed by the Department for removing the objection, has caused much merriment among scale makers. An attempt is then made to describe the part objected to, and the proposed substitute, but this is done in language which conveys an entirely erroneous idea of both. The person who prompted the writer of the article knew the reason why the objections, to the kind of scale were taken, but he carefully suppressed it, and I am willing to believe that if he had stated it to the writer of the article, that gentleman would have seen that it was taken in the interest of the public.

The *wrought iron bar* is not used as a means of strength, but as a means of countervailing slovenly work. The adjustment of the scale is effected by bending this bar in either direction, which is easily done; but after the scale leaves the maker's hands it can be tampered with so easily, and can be so readily made to serve fraudulent purposes, that it would be almost criminal to admit it to use under the sanction of a Government stamp, especially when the remedy is so simple.

For the ductile bar of iron it is proposed to substitute a block of cast metal, either forming one piece with the frame of the scale, or riveted to it so that it cannot be tampered with without the use of such a degree of violence as might be readily detected by the Inspector. To do this it becomes necessary to drill a small hole about one-tenth of an inch in diameter, for the centre pin, in a definite place, instead of drilling it at random in the wrought iron bar, and afterwards forcing it into its place by bending the bar.

Why the *Spectator* should imagine that the metal cast solid with the frame would be less substantial than the small piece of wrought iron less than  $\frac{1}{4}$  of an inch square, which has heretofore been used I cannot understand.

If we are to believe the *Spectator*, no trader would on any account knowingly use a false weight, measure or balance, and, if by accident he did do so, his customers would speedily discover the error. Unhappily, the Department has abundant evidence that all traders are not so accurate in their weights as the *Spectator* would have us believe; and, to the assertions as to the ease with which errors are detected by buyers, the fact that we have a number of cases where the platform scales of wholesale dealers have been erroneous to the extent of from five to ten per cent., is a sufficient reply.

When the writer in the *Spectator* condescends to specific statements as to what he objects to in the regulations, there is no difficulty in answering him. Let me refer you to what he says about measures of capacity. He says: "The regulation requires a peculiar kind of seam in the construction of tin measures of capacity." Of course, he cannot point to such a regulation as he refers to, for there is no such regulation and never was. It is true that one of our officers, who professes to possess some knowledge of that branch of mechanism, took a fancy to a particular mode of putting the work together, and in that way caused some annoyance. But the minute it came to the knowledge of the Department, he was instructed that the regulations gave him no authority to interfere in matters of that kind, and he has ceased to do so.

The whole scope of the regulations in reference to measures of capacity, is to insure that they shall be made of material of such strength that they cannot be readily put out of shape, and that their form shall be such as to facilitate verification. How necessary the first condition is, may be ascertained by an inspection of the measures which have been seized; and as to form, it was believed that as the adoption of the Imperial measure would lead to the early and general construction of new measures, a fitting opportunity was afforded for introducing the cylindrical form, which can be verified by the special gauge, constructed for that purpose, thus saving the necessity of carrying the standard's of capacity through the country, and saving a large share of what the cost of inspection would otherwise be.

The sensational story about the manufacturer who sent barrels full of measures to a distant place to have them stamped because they could not pass muster in Hamilton, if true—which I doubt—only proves that one of the Inspectors is incompetent. I may suggest that if the manufacturer instead of sending his "*barrels full*" to the distant Division had sent one of the measures here, he might have obtained a final decision, possibly in his favour, at much less cost.

What are the alterations in the regulations as to these measures of which complaint is made? There has been but one alteration from the outset; that is in the direction of restriction. The original regulations required that the denomination of the measures should be stamped on them in legible characters. Availing themselves of the vagueness of this rule many manufacturers stamped them in characters so small that they could only be discerned on rigid examination. This would have been of comparatively small consequence if there had been but one description of measures, but when Parliament by the Act of last Session indefinitely deferred

the time at which the Wine and Winchester measures should cease to be tolerated, it became necessary, in view of the probability of the use of the Wine measures being largely continued, for the protection of the public, to require that both should be so marked that the buyer could without difficulty see what measure he was served with; hence the rule that the characters used for marking them should be in height equal to one-tenth the height of the measures.

I feel that I have already discussed this matter at too great a length and must have wearied you. I confess too that I am somewhat discouraged as regards your city, by the fact that nothing in connection with the inspection is *publicly* discussed upon its merits. The opposition papers stick at nothing to make a case against the Government, and care only to stand well with their friends the manufacturers. The Ministerial paper, either because it is not sufficiently well acquainted with the subject, or because it desires to hit the late Government, are afraid to endorse what its own friends are doing, even though it can be shown to be in the interest of the public. Of course the few who have a selfish interest in maintaining the old state of things can make a good deal of noise, just as a dozen claquiers, in a theatre can get up a good deal of applause; but I have reason to know that the general public are beginning to understand their interest in the matter, and if the threat suggested by the *Times* has any foundation, it will speedily happen that the buyers will resist being again placed at the absolute mercy of the seller.

I think in my last I expressed some surprise that the great mass of the people—the buyers—had no share in the sympathy of the *Spectator*, who is so anxious for the interests of the seller. On second thoughts I am not surprised—the seller advertises. The buyer does not.

Yours truly,

A. BRUNEL,

Ottawa, October 25th, 1877.